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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/678,041	10/03/2000	Gary E. Horst	EMCS:027	5663

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EXAMINER

PEREZ, GUILLERMO

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/678,041	HORST, GARY E.
	Examiner Guillermo Perez	Art Unit 2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 12 June 2002.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-19 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12 June 2002 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on 12 June 2002 is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                           | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 . | 6) <input type="checkbox"/> Other: _____ .                                   |

## DETAILED ACTION

### *Drawings*

The corrected or substitute drawings were received on June 12, 2002. These drawings are acceptable.

The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on June 12, 2002 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

### INFORMATION ON HOW TO EFFECT DRAWING CHANGES

#### 1. Correction of Informalities -- 37 CFR 1.85

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

#### 2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.

All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

### **Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Cho (U. S. Pat. 5,959,373).

Referring to claim 1, Cho discloses a linear electromagnetic machine comprising:  
a movable member (30);  
a stationary member (9) defining at least one stationary pole;  
a phase winding positioned such that, when current is flowing in the phase winding, the at least one stationary pole is energized; and  
a circuit (figure 3) for energizing the phase winding over a plurality of energization cycles to produce a given force tending to cause linear movement of the

movable member (30) with respect to the stationary member (9), the energizing of the phase winding also producing a normal force (thrust) tending to cause movement of the movable (30) and stationary (9) members in a direction normal to the desired linear movement; wherein

the normal force profile (thrust) experienced by the at least one stationary pole over a first energization cycle is different from the normal force profile (thrust) experienced by the at least one stationary pole over a subsequent energization cycle (figures 12).

Referring to claim 2, Cho discloses that the movable member (30) defines a plurality of movable poles (figure 8A) that pass over the at least one stationary pole as the movable member (30) moves in the desired direction and wherein at least one of the movable poles is different in construction from other of the movable poles.

Referring to claim 3, Cho discloses that the movable poles each define a pole width ( $p_i$ ) and wherein at least one of the movable poles has a width ( $p_i$ ) that is greater than the width ( $p_i$ ) of other of the movable poles (figure 8A).

Referring to claim 4, Cho discloses that the movable poles all have substantially the same width ( $p_i$ ), wherein each movable pole defines an air gap with respect to the stationary pole as it passes over the stationary pole, and wherein the air gap defined by at least one of the movable poles is different from the air gap defined by other of the movable poles (see figure 8C).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Cho in view of Delson et al. (U. S. Pat. 6,002,184).

Cho substantially teaches the claimed invention except that it does not show that the circuit for energizing the phase winding provides an energization current to the phase winding over a first energization cycle that is different from the energization current provided to the phase winding over a second energization.

Delson et al. disclose that the circuit for energizing the phase winding provides an energization current to the phase winding over a first energization cycle that is different from the energization current provided to the phase winding over a second energization (column 36, lines 41-57). The invention of Delson et al. has the purpose of controlling the overall stiffness of the embodiment.

It would have been obvious at the time the invention was made to modify the motor of Cho and provide it with the energization current pattern disclosed by Delson et al. for the purpose of controlling the overall stiffness of the embodiment.

3. Claims 6-8, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzuka (U. S. Pat. 4,217,508) in view of Keljik (Electric Motors and Motor Controls; Jeff Keljik; Delmar Publishers 1995; pages 9-12).

Uzuka discloses an electromagnetic machine comprising:  
a rotor (101) defining a plurality of rotor poles (108A,108b,107a,107G in figure 18A), each rotor pole (108A,108B,107A,107G) having a pole face defining an angular width, wherein the angular width of the rotor pole with the widest width (18A) is:

(a) substantially equal to the angular width of the rotor pole with the narrowest width (108b), and

(b) less than 1.5 times the angular width of the rotor pole with the narrowest width (108b);

a stator (103) defining at least two stator poles (created by windings 110A,110B) that are radially opposed to one another;

a phase winding (110A, 110B) positioned such that, when current is flowing in the phase winding (110A, 110B), the at least two stator poles (induced by windings 110A,110B) are energized; and

a circuit (figure 7A) for energizing the phase winding (110,111) over a plurality of energizing cycles to produce a given desired output on the rotor (column 11, lines 11-52), the energizing of the phase winding (110,111) cause movement of the at least two stator poles towards the rotor (figure 6A);

wherein the influence experienced by the at least two stator poles (created by windings 110,111 in figure 5A) over a first energizing cycle ( $\theta_1-\theta_2$  in figure 6A) is different from the influence experienced by the at least two stator poles (created by windings 110,111 in figure 5A) over a subsequent energizing cycle ( $\theta_1-\theta_2$  in figure 6A

and column 11, lines 11-52). Uzuka discloses that the rotor defines a plurality of rotor poles (107,108) and wherein:

during the first energization cycle, a first pair of opposing rotor poles (107) is brought towards alignment with the at least two stator poles (110);

over the second energization cycle, a second pair of opposing rotor poles (108) is brought towards alignment with the at least two stator poles (110); and

the construction of the poles forming the first pair of opposing rotor poles (107) is different from the construction of the poles forming the second pair of opposing rotor poles (108). Uzuka discloses that the angular width of the rotor poles forming the first pair of opposing rotor poles is substantially the same as the angular width of the rotor poles forming the second pair of opposing rotor poles (108A,108b,107a,107G in figure 18A). Uzuka discloses that the rotor includes a plurality of permanent magnets (108A,108b,107a,107G in figure 18A).

However, Uzuka does not disclose that the energizing of the phase winding also produces a normal force experienced by the at least two stator poles.

Keljik discloses that the energizing of the phase winding also produces a normal force (attracting or repulsing) experienced by the stator poles (which would cause the stator poles to move toward the rotor if it was not retained by the bearings page 9) since it is an inherent property of the magnetic fields.

It would have been obvious at the time the invention was made for the magnetic fields of Uzuka to apply a normal force between the fixed and movable poles of the machine since it is an inherent property of the magnetic fields.

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzuka in view of Keljik as applied to claim 8 above, and further in view of Horst et al. (U. S. Pat. 5,701,064).

Uzuka and Keljik substantially teaches the claimed invention except that it does not show that a maximum air gap established between the first pair of opposing rotor poles and the at least two stator poles is different from the maximum air gap established between the second pair of opposing rotor poles and the at least two stator poles.

Horst et al. disclose that a maximum air gap established between the first pair of opposing rotor poles (22b) and the at least two stator poles (18b in figures 1-2) is different from the maximum air gap established between the second pair of opposing rotor poles (22a) and the at least two stator poles (18b). The invention of Horst et al. has the purpose of detecting the rotor position.

It would have been obvious at the time the invention was made to modify the motor of Uzuka and Keljik and provide it with the air gap configuration disclosed by Horst et al. for the purpose of detecting the rotor position.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzuka in view of Keljik and further of Horst et al. as applied to claim 9 above, and further in view of Habermann (U. S. Pat. 4,774,424).

Uzuka, Keljik and Horst et al. substantially teaches the claimed invention except that it does not show that the maximum air gap established between the first pair of opposing rotor poles and the at least two stator poles is defined by a notch in the profile of the face of the rotor pole.

Habermann discloses that the maximum air gap established between the first pair of opposing rotor poles and the at least two stator poles is defined by a notch (31) in the profile of the face of the rotor pole. Habermann's invention has the purpose of effect a direct measuring of the induction in the air gap of an electromagnetic machine.

It would have been obvious at the time the invention was made to modify the machine disclosed by Uzuka, Keljik and Horst et al. and provide it with the notch disclosed by Habermann for the purpose of effect a direct measuring of the induction in the air gap of an electromagnetic machine.

6. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzuka in view of Keljik as applied to claim 6 above, and further in view of Delson et al. (U. S. Pat. 6,002,184).

Uzuka and Keljik substantially teaches the claimed invention except that it does not show that the circuit for energizing the phase winding provides an energization current to the phase winding over a first energization cycle that is different from the energization current provided to the phase winding over a second energization cycle.

Delson et al. disclose that the circuit for energizing the phase winding provides an energization current to the phase winding over a first energization cycle that is different from the energization current provided to the phase winding over a second energization cycle (column 36, lines 41-57). The invention of Delson et al. has the purpose of controlling the overall stiffness of the embodiment.

It would have been obvious at the time the invention was made to modify the motor of Uzuka and Keljik and provide it with the energization current pattern disclosed by Delson et al. for the purpose of controlling the overall stiffness of the embodiment.

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over E.

R. Lang (U. S. Pat. 3,260,871) in view of Keljik.

E. R. Lang discloses an electromagnetic machine comprising:

a rotor (24A) defining a plurality of rotor poles (N,S), each rotor pole (N,S) having a pole face defining an angular width, wherein the angular widths of each of the rotor poles (N,S) are substantially the same (figure 4);

a stator defining a first set of opposing stator poles (formed by coils 80) and a second set of opposing stator poles, each of the stator poles (formed by coils 80) being associated with at least one current carrying member (80) such that a stator pole is energized when current is flowing through a current carrying member associated with the stator pole (figures 8-9); and

a circuit (figure 8) for energizing the at least one current carrying member (80) over a given interval (figure 9) so as to simultaneously energize the first and second sets of opposing stator poles (figure 8);

the influence experienced by the first pair of opposing stator poles over the given interval is substantially different from the influence experienced by the second pair of opposing stator poles over the given interval. However, E. R. Lang does not disclose that energizing of the current carrying member also produces normal forces tending to cause movement of the energized stator poles towards the rotor.

Keljik discloses that the energizing of the phase winding also produces a normal force (attracting or repulsing) experienced by the stator poles (which would cause the stator poles to move toward the rotor if it was not retained by the bearings page 9) since it is an inherent property of the magnetic fields.

It would have been obvious at the time the invention was made for the magnetic fields of E. R. Lang to apply a normal force between the fixed and movable poles of the machine since it is an inherent property of the magnetic fields.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over E.

R. Lang in view of Keljik as applied to claim 14 above, and further in view of Uzuka.

E. R. Lang and Keljik substantially teaches the claimed invention except that it does not show that during the given interval, a second pair of opposing rotor poles is brought towards alignment with second set of opposing stator poles; and that

the construction of the poles forming the first pair of opposing rotor poles is different from the construction of the poles forming the second pair of opposing rotor poles.

Uzuka discloses that during the given interval, a second pair of opposing rotor poles (107) is brought towards alignment with second set of opposing stator poles (110); and that

the construction of the poles forming the first pair of opposing rotor poles (108) is different from the construction of the poles forming the second pair of opposing rotor

poles (108). Uzuka's invention has the purpose of avoiding the reduction of the operational torque generated over 360 degrees to zero torque.

It would have been obvious at the time the invention was made to modify the motor of E. R. Lang and Keljik and provide it with the rotor poles configuration disclosed by Uzuka for the purpose of avoiding the reduction of the operational torque generated over 360 degrees to zero torque.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over E. R. Lang in view of Keljik as applied to claim 14 above, and further in view of Nitta (U. S. Pat. 6,181,047).

E. R. Lang and Keljik substantially teaches the claimed invention except that it does not show that the construction of the stator poles comprising the first set of opposing stator poles is different from the construction of the stator poles comprising the second set of opposing stator poles.

Nitta discloses that the construction of the stator poles comprising the first set of opposing stator poles (5) is different from the construction of the stator poles comprising the second set of opposing stator poles (4) for the purpose of improving starting characteristics in permanent magnet motors.

It would have been obvious at the time the invention was made to modify the motor of E. R. Lang and Keljik and provide it with the stator poles configuration disclosed by Nitta for the purpose of improving starting characteristics in permanent magnet motors.

10. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over E. R. Lang in view of Keljik and further of Nitta as applied to claim 15 above, and further in view of Horst (U. S. Pat. 5,670,836).

E. R. Lang, Keljik and Nitta substantially teaches the claimed invention except that it does not show that each of the stator poles in the first set of opposing stator poles defines a notched surface.

Horst discloses that each of the stator poles in the first set of opposing stator poles defines a notched surface (C). Horst's invention has the purpose of positioning the rotor in a stable detent position to facilitate starting of the machine.

It would have been obvious at the time the invention was made to modify the machine of E. R. Lang, Keljik and Nitta and provide it with the notch configuration disclosed by Horst for the purpose of positioning the rotor in a stable detent position to facilitate starting of the machine.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over E. R. Lang in view of Keljik as applied to claim 14 above, and further in view of Delson et al.

E. R. Lang and Keljik substantially teaches the claimed invention except that it does not show that the circuit for energizing the at least one current carrying member provides an energization current to the first current carrying member that is different from the energization current provided to the second current carrying member over the given interval.

Delson et al. disclose that the circuit for energizing the at least one current carrying member provides an energization current to the first current carrying member that is different from the energization current provided to the second current carrying member over the given interval (column 36, lines 41-57). The invention of Delson et al. has the purpose of controlling the overall stiffness of the embodiment.

It would have been obvious at the time the invention was made to modify the motor of E. R. Lang and Keljik and provide it with the energization current pattern disclosed by Delson et al. for the purpose of controlling the overall stiffness of the embodiment.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308 1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

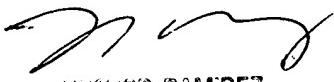
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305 3432 for regular communications and (703) 305 3432 for After Final  
communications.

Any inquiry of a general nature or relating to the status of this application or  
proceeding should be directed to the receptionist whose telephone number is (703) 308  
0956.

Guillermo Perez  
August 23, 2002

  
GUILLERMO RAMIREZ  
RECEIPTIONIST/EXAMINER  
TELEPHONE NUMBER 308-0956  
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